



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,739	02/07/2006	Esther Breuning	14113-00033-US	5924
23416 7590 02/28/2011 CONNOLLY BOVE LODGE & HUTZ, LLP P O BOX 2207 WILMINGTON, DE 19899				
EXAMINER				
WILSON, MICHAEL H				
ART UNIT		PAPER NUMBER		
1786				
MAIL DATE		DELIVERY MODE		
02/28/2011		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/561,739

Applicant(s)

BREUNING ET AL.

Examiner

MICHAEL H. WILSON

Art Unit

1786

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2, 6, 8-14, 17-22, 24, 26-29, 32-36 and 38-43 is/are pending in the application.
- 4a) Of the above claim(s) 20, 21, 26-29, 32, 33, 36, 39 and 43 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2, 6, 8-14, 17-19, 22, 24, 34, 35, 38 and 40-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-352)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB-08)
Paper No(s)/Mail Date 20101112
- 4) ☐ Interview Summary (PTO-813)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This Office action is in response to Applicant's amendment filed 01 December 2010, which amends claims 6, 9-11, 14, 27-29, 33, 34, 38, 40, and 41 and adds new claims 42 and 43.

Claims 2, 6, 8-14, 17-22, 24, 26-29, 32-36, and 38-43 are pending.

2. Applicants overcame the rejection of claims 2, 8-14, 22, 24, 38, 40 and 41 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention by amending the claims in the reply filed 1 December 2010.

3. Claims 20, 21, 26-29, 32, 33, 36, 39, and 43 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 29 October, 2008.

4. Claims 6, 17-19, and 35 are no longer withdrawn because they currently read on the elected invention.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 2, 6, 8, 9, 11-13, 17-19, 22, 24, and 40 are rejected under 35

U.S.C. 102(e) as being anticipated by Roberts et al. (US 200/0062930 A1).

Regarding claims 2, 8, and 40, Roberts et al. disclose a mixture comprising at least one conjugated polymer [0007], a bridged carbazole unit ([0086]-[0087], structure XCII), and a triplet emitter [0161]. Additionally, the reference discloses mixtures within the claimed ranges [0163]. The disclosed ranges correspond to approximately 40-95% by weight of at least one conjugated polymer, 7.5% (0.1*75) or less of at least one bridged carbazole unit, wherein instant R (biphenyl) is a combination of two aromatic ring systems (benzene), and 0.05-10% by weight of at least one triplet emitter [0163]. Additionally, the reference discloses the conjugated polymer selected from the groups meta- or para- phenylenes, 1,4-naphthylenes, fluorenes, or indenofluorenes ([0065] pages 6-8 and [0083]). The reference discloses wherein a bicarbazole unit is incorporated into the polymer via the 2, 7-position ([0086]-[0087], structure XCII). Additionally, the reference discloses wherein a compound of instant formula (II) is added to the mixture ([0391], CBP = bicarbazole-biphenyl).

Regarding claims 6 and 17-19, Roberts et al. disclose all the claim limitations as set forth above. Additionally the reference discloses a layer comprising the polymer and CBP in a 10:18 ratio with 0.01-0.5 wt/wt% of a triplet emitting iridium complex which meet the weight % ranges of present claim 6.

Regarding claim 9, Roberts et al. disclose all the claim limitations as set forth above. Additionally while the reference does not disclose wherein R" is a vinyl or acetylene unit the claim does not require R" to be either of these groups. Therefore the claim limitations as met as set forth above.

Regarding claim 11, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements of the polymer are selected from the groups meta- or para-phenylenes, 1,4-naphthylenes, fluorenes, or indenofluorenes ([0065] pages 6-8 and [0083]).

Regarding claim 12, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements which improve charge transport ([0085]-[0086]).

Regarding claim 13, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements are selected from the groups of the triarylaminines ([0087] structures XCIII to XCVI) or the oxadiazolylenes ([0073] structures LV to LVII, LIX, LXII, and LXIV to LXVII).

Regarding claim 22, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein any further molecules, which may be low molecular weight, oligomeric, or polymeric, may also be added to the mixture [0163].

Regarding claim 24, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein the total bicarbazole content is within the claimed range [0163]. The total content based on combining the weight of

bicarbazole polymer units and the weight of CBP is approximately 57% by weight or less [0163].

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 200/0062930 A1) as applied to claim 40 above.

Regarding claim 10, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally while the reference does not explicitly disclose the bicarbazole unit having additional substituents the reference discloses hole transporting units may have additional substituents, such as C1-20 alkyl groups or alkyloxy groups ([0087], [0088], and [0090]) ,including arylamine and carbazole units [0087]. Therefore it would be obvious to one of ordinary skill in the art that the bicarbazole units could also

be substituted with C1-20 alkyl groups or alkyloxy groups and be suitable for the polymers of modified Roberts et al. given the disclosure of Roberts et al. as a whole.

10. Claims 14, 34, 35, 38, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 200/0062930 A1) as applied to claim 40 above and in view of Hu et al. (US 6,670,054 B1) and Kondakova et al. (US 2005/0123797 A1).

Regarding claims 14, 34, 35, 38, and 41, Roberts et al. disclose a mixture comprising at least one conjugated polymer [0007], a bridged carbazole unit ([0086]-[0087], structure XCII), and a triplet emitter [0161]. Additionally, the reference discloses mixtures within the claimed ranges [0163]. The disclosed ranges correspond to approximately 40-95% by weight of at least one conjugated polymer, 7.5% (0.1*75) or less of at least one bridged carbazole unit, wherein instant R (biphenyl) is a combination of two aromatic ring systems (benzene), and 0.05-10% by weight of at least one triplet emitter [0163]. Additionally, the reference discloses the conjugated polymer selected from the groups meta- or para- phenylenes, 1,4-naphthylenes, fluorenes, or indenofluorenes ([0065] pages 6-8 and [0083]). The reference discloses wherein a bicarbazole unit is incorporated into the polymer via the 2, 7-position ([0086]-[0087], structure XCII). Additionally, the reference discloses wherein a compound of instant formula (II) is added to the mixture ([0391], CBP = bicarbazole-biphenyl). However the reference does not explicitly disclose carbazole units in the polymer or compound of instant formula (II) with bridging groups which are not two benzene groups.

Hu et al. teach carbazole compounds for use in electroluminescent devices (abstract). The reference teaches that the linking groups between the carbazoles may be one of several different aryl and heteroaryl groups including phenyl, biphenyl, triphenyl, 9,10-anthracene, stilbenyl, 2,6-naphthylene and thiophene (column 4, line 59 to column 5, line 60). The reference recognized the equivalency of the groups by teaching them together as suitable linking units and teaches these compounds to be suitable as suitable host materials in the a luminescent layer comprising phosphorescent material (column 7, lines 12-18).

In view of Hu et al.'s recognition that biphenyl, phenyl, 9,10-anthracene, stilbenyl, 2,6-naphthylene and thiophene are equivalent and interchangeable, it would have been obvious to one of ordinary skill in the art to substitute biphenyl with phenyl, 9,10-anthracene, stilbenyl, 2,6-naphthylene or thiophene. Case law holds that the mere substitution of an equivalent (something equal in value or meaning, as taught by analogous prior art) is not an act of invention; where equivalency is known to the prior art, the substitution of one equivalent for another is not patentable. See *In re Ruff* 118 USPQ 343 (CCPA 1958).

Kondakova et al. teach another organic electroluminescent device (abstract). The reference teaches carbazole compounds like CBP are good host material for light-emitting layers can serve as both hole and electron transporting host materials ([0021] and [0022]). The reference teaches the carbazoles ([0022] formula (1)) can be linked with arylene or aliphatic groups including 1,3-propyl [0023]. The reference teaches the

carbazole compounds can be used to improve the light-emitting layers electrical properties [0024].

It would be obvious to one of ordinary skill in the art at the time of the invention to replace CBP in the device of Roberts et al. with a carbazole compound taught by Kondakova et al., including a compound of Kondakova et al.'s formula (1) with a linking group of 1,3-propyl. One of ordinary skill in the art to reasonably expect such a combination to be suitable because both references disclose carbazole compounds used as host materials in the light-emitting layer of an organic electroluminescent device. One of ordinary skill in the art would be motivated by a desire to improve the electrical properties of the light-emitting layer.

11. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 200/0062930 A1) as applied to claim 40 above and in view of Treacher et al. (WO 02/077060 A) English equivalent (US 2004/0135131 A1) relied upon.

Regarding claim 42, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses the conjugated polymer selected from the groups meta- or para- phenylenes, 1,4-naphthylenes, fluorenes, or indenofluorenes ([0065] pages 6-8 and [0083]). However the reference does not explicitly disclose spirofluorene as a suitable copolymer unit.

Treacher et al. teach conjugated polymers for use in organic electroluminescent devices (abstract). The reference teaches fluorene and spirobifluorene copolymers as suitable for polymers used in charge transporting or luminescent layers ([0134]-[0135]).

The reference teaches that using both fluorene and spirobifluorene units in a polymer results in higher luminous efficiency, greater brightness as the same energy consumption, and a longer operating life ([0034]-[0037]).

It would be obvious to one of ordinary skill in the art at the time of the invention to use the spirobifluorene copolymer units of Treacher et al. in the polymer of Roberts et al. One of ordinary skill in the art would reasonably expect such a combination to be suitable given that Treacher teaches both units as suitable for polymers in organic electroluminescent devices and that Roberts et al discloses fluorene as suitable. One of ordinary skill would be motivated by a desire to have higher luminous efficiency, greater brightness as the same energy consumption, and a longer operating life.

Response to Arguments

12. Applicant's arguments filed 14 June 2010 have been fully considered but they are not persuasive.

Applicants argue that the claims require a dicarbazole compound which is bridged by an alkylene group, a vinylene group, or an acetylene unit. However while that is the case for claims 14, 34, 35, 38, and 41, the other active claims include aromatic or heteroaromatic ring systems to be R" of formula (II), for example see the last page of claim 40 (page 30 of the claims) the fourth line.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL H. WILSON whose telephone number is (571)270-3882. The examiner can normally be reached on Monday - Thursday 7:30-5:00 (EST), Friday 7:30-4:00 with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

15. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 1786

MHW